could be seen anywhere close by. Also, the displaying male was observed chasing away a foraging *O. sutorius* and *M. cinclorhynchus* when perched close by.

However, on 22 December 1991, a female was observed promptly answering the high pitched call note by a male, with a single short note (*tweet*). Upon disturbance the male flew up to an overhanging branch and started swaying from side to side while uttering a low *kit-kit-kit-kit*.. call.

Pied ground thrush: A male of this species was first sighted at Nandi hills on 29 March 1991 by two of us (JNP, SS) busily foraging, overturning fallen dry leaves along the edge of the Pathalaganga, a small pond between the evergreen patch and the nursery. Later it was seen along the edge of yet another large pond Amruth ganga, a water tank constructed in stone with steps going down to the bottom. the male was observed foraging amidst fallen leaves unmindful of a Spotted Babbler *Pellorneum ruficeps* and Magpie Robin *Copsychus saularis* in the same area and on the next day it was foraging along with *E. brunneus*. It was observed tossing dry leaves most of the day along the water's edge. Once it was noticed hopping amongst pots in the nursery and also once in the coffee plantation.

The species was again observed in the same area between 5 November 1991 (L. Shyamal, pers. comm.) and 9 January 1992 (see Table 1).

Both the species discussed above, winter in Sri Lanka. In addition *E. brunneus* is also known to winter in the hills of western India (Ali and Ripley 1987). Also both the species have been observed in passage at Bangalore (Karthikeyan 1992, Prasad and Srinivasa 1992, Shyamal 1989). *Z. wardii* has been reported as wintering at Yercaud in the Shevroy hills, Tamil Nadu (Kazmierczak 1991). Our observations on the continued presence of the individuals of the species during winter and early summer at Nandi hills clearly indicate that the individuals were those spending their winter. Thus, Nandi hills happens to be hitherto unknown winter quarters of both *E. brunneus* and *Z. wardii*.

Also, though the frequency of sightings of females were less, our observations on the occurrence of both the sexes of *E. brunneus* together at Nandi Hill refutes the claim made by Khan (1980) that both the sexes of *E. brunneus* do not move together and that females spend their winters away from males.

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21. SIMPLIFIED FIELD TECHNIQUE FOR OBTAINING BLOOD FROM FRESHWATER TURTLES

Studies on the biochemical and molecular aspects have now been recognised as essential components of the conservation programme of species. The choice of tissue in such studies has invariably been blood and this has necessitated researchers to look for the best procedure for field sampling without harming or

sacrificing the animal.

Several methods have been proposed to obtain uncontaminated blood, each having its merit restricted to the species under study or to the specific experiment. The most common method of collection of samples of blood in reptiles has been cardiac puncture (Gandal 1958, Stephens and Creekmore 1983) but is less popular for turtles because of their thick plastron. Cutting off the tip of the tail (Guguy 1970), toe-nail clipping (Frye 1991) or collecting blood from the major veins and arteries (Maxwell 1979) have been some of the other proposals. Each of them has at least one disadvantage, for example, intricate dissection of veins/arteries is required (Avery and Vitt 1984). The procedure for obtaining blood samples from the ventral caudal vein as suggested by Galbraith (pers. comm.) and described in alligator snapping turtles (Powell and Knesel 1992) had been initially utilized in our procedure but we had to discard it as the amount of blood obtained was not enough for multiple analyses. Falling back on the oldest method of heart puncture by inserting a long needle laterally through the soft tissue between the plastron and the carapace, we found that the forelimb provides the safest and the shortest path to reach the heart avoiding drilling of the plastron. In addition, our technique does not require elaborate equipment and can be used easily in the field.

We have applied this technique on two turtles of the genus *Kachuga: K. tentoria* and *K. dhongoka.* These are primarily medium sized turtles with males ranging between 10-20 cm and females between 22.5-45 cm in carapace length. Presumbaly this technique can be applied to many other turtles of similar size.

Handling of turtles to keep them immobile is a skill of the field worker and no standard procedure can be described for it. However, the turtle has to be suspended in a manner that the head hangs freely downward and the forelimb remains unrestrained. The weight of the body forces the forelimb to stretch, but this may need some time. In this position the right forelimb can be stretched at an angle of 35° from the head. The skin joining the leg with the carapace is dabbed with 95% alcohol in order to sterilize the area.

A 5-9 cm long 22 guage hypodermic needle attached to a 5 ml syringe is inserted parallel to the stretched forelimb. The needle is gently inserted till it reaches the ventricle. The depth of needle penetration is often between 2.5-7.5 cm. Gentle suction is applied until blood spurts into the syringe and withdrawal pressure is then slowly increased, until the syringe is at its full suction capacity. The needle is then slowly pulled out, with full syringe suction still being applied. About 2-3 ml of blood is drawn per sample. No pressure is applied for the control of bleeding as no visible bleeding occurs in this procedure. However, germicidal powder is immediately sprinkled at the point of insertion of needle before marking and releasing the turtles.

Blood samples have successfully been collected from over 50 fresh water turtles and several of them have been utilized for repetitive blood lettings and maintained in captivity for over 4 months with no apparent ill-effects. For field sampling this procedure provides a safe; practical and simple technique for obtaining blood from turtles.

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